

WHAT IS CLAIMED IS:

Subaloy

1. A projection electrode comprising:
an electrode section for making contact with
a corresponding testing target electrode; and
5 one or a plurality of bumps formed on a surface
of this electrode section and having a pointed end or
ends.

2. A projection electrode according to claim 1,
wherein the bump has a pointed tapering end in vertical
10 cross-section.

3. A projection electrode according to claim 1,
wherein the bump has a pointed tapering end in vertical
cross-section and a ridge-like configuration.

09842047 042601

*Claims 4-7
29/846
ga 15 9/26/02*

4. A method for forming a projection electrode,
comprising the steps of:
forming an electrode pattern on a wiring board;
forming a mask pattern for masking a non-etching
portion including a portion forming a tapering bump of
the electrode pattern formed at this step;
20 etching the electrode pattern with the mask
pattern formed by this step and forming the tapering
bump; and

eliminating the mask pattern.

5. A method according to claim 4, further
25 comprising (the step of forming a plated layer) by
a plating process on (the mask pattern-eliminated
electrode pattern).

6. A method according to claim 4, wherein the step of forming a tapering bump comprising a wet etching step utilizing a corrosion action of an etching solution from around the mask pattern.

5 7. A method according to claim 6, further comprising the step of forming a plated layer by a plating process on (the mask pattern-eliminated electrode pattern).

10 8. An apparatus for testing an electronic component, comprising:

an electrode section set in contact with a testing target electrode;

one or a plurality of bumps formed on a surface of the electrode section and having a pointed end;

15 a wiring pattern connected to the bump or bumps; and

a testing apparatus body connected to the wiring pattern.

20 9. An apparatus according to claim 8, wherein the bump has a pointed tapering end in vertical cross-section.

10. An apparatus according to claim 8, wherein the bump has a pointed tapering end in vertical cross-section and a ridge-like configuration.

25 11. A projection electrode formed in a specific pattern on a wiring board, said projection electrode comprising:

09842047 042601

a projection formed of an insulating layer and having a cross section shaped like a mountain having a pointed peak; and

5 at least one bump provided on the projection and formed of a metal layer.

12. The projection electrode according to claim 11, wherein the insulating layer is made of a material selected from the group consisting of polyimide-based resin and epoxy-based resin.

10 13. The projection electrode according to claim 11, wherein the metal layer is made of a metal selected from the group consisting of Cu, Ni, Ag, Au, Cr, Pt, Rh and Pd.

15 14. The projection electrode according to claim 11, wherein the projection is formed by etching the insulating layer.

15. The projection electrode according to claim 11, wherein the projection is formed by applying a laser beam to the insulating layer.

20 16. The projection electrode according to claim 11, wherein the projection is formed by means of stamping.

25 17. The projection electrode according to claim 11, wherein the metal layer is formed by physical vapor deposition or a combination of plating and etching.

18. The projection electrode according to

09342047 042601

claim 11, wherein the metal layer comprises a plurality of layers formed one upon another.

19. A method for forming a projection electrode in a specific pattern on a wiring board and having at least one bump which has a cross section shaped like a mountain having a pointed peak, said method comprising the steps of:

processing an insulating layer, thereby forming a projection having a cross section shaped like a mountain;

forming a metal layer on the projection formed of the insulating layer; and

removing a part of the metal layer.

20. The method according to claim 19, wherein the step of processing an insulating layer is a step of performing isotropic etching on the insulating layer.

21. The method according to claim 19, wherein the step of processing an insulating layer is a step of applying a laser beam to the insulating layer.

22. The method according to claim 19, wherein the step of processing an insulating layer is a step of pressing a stamper onto the insulating layer before the insulating layer is hardened completely, said stamper having a groove identical in shape to the projection.

23. The method according to claim 19, wherein the step of forming the metal layer is a step of performing physical vapor deposition or a combination of plating

Claims 19-23
28/846
9/26/02 op

09842047-042601

and etching, thereby to form a metal layer in a prescribed pattern.

24. A testing apparatus for testing electronic components, said apparatus comprising:

5 a wiring board having; and

a projection electrode which is formed on the wiring board, which is to contact an electrode of an electronic component and which comprises:

10 a projection formed of an insulating layer and having a cross section shaped like a mountain having a pointed peak; and

at least one bump provided on the projection and formed of a metal layer.

099240" 24024860